

Hobbies

WEEKLY

CONTENTS

	Page
Doll's Pram Styles	- 73
Record Repeater	- 75
Winter Cycling	- 76
One-Valve Amplifier	- 77
Drawing Ellipses	- 78
Model Railways	- 79
Log Holder	- 80
Photograph Enlarging	- 81
Record Repeater Patterns	- 83

SUPPLEMENT SHEET
FOR 6-WHEEL OPEN
LORRY

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DOLL'S PRAM STYLES

THE pram illustrated may seem unusual, but it does please the kiddies. Something like a pram is better than nothing. It happens to be the easiest and cheapest model that could be made. The other designs are a bit more elaborate and conventional, and will serve to give you ideas.

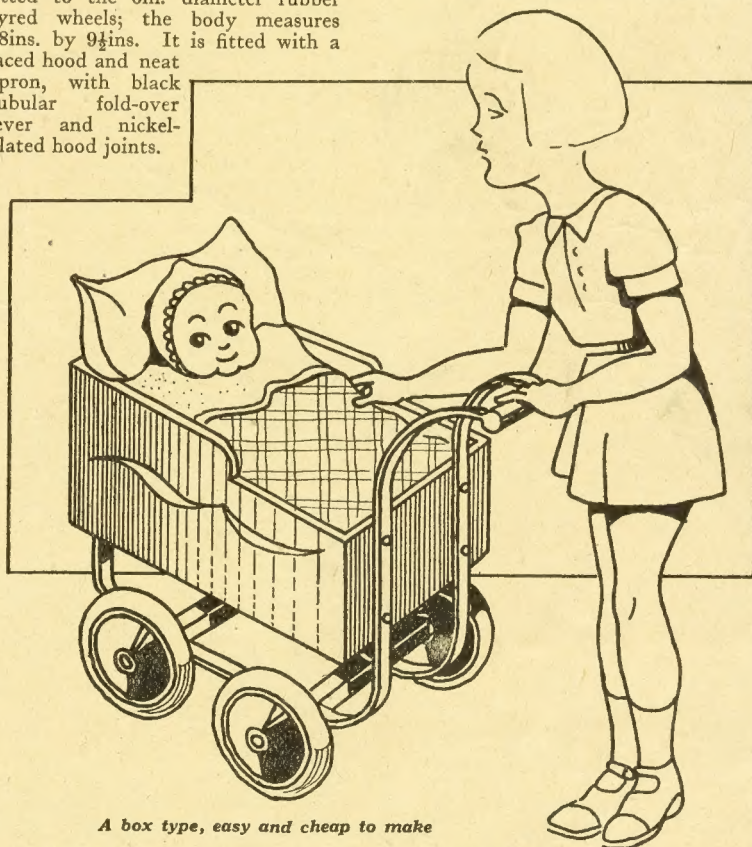
It is always about this time of the year that our readers look for suggestions for Christmas gifts. A toy pram is always a welcome present. Instead, however, of confining you to one particular design, you have three models to choose—each of which are very simple to construct.

Steel disc wheels with rubber tyres are used, and there should be no difficulty in obtaining a set of these wheels of the diameters mentioned. The wheels really give a professional touch to the finish of the toy. Hardwood wheels, with red-fluted centres, if available, could be used to keep down expense. In the long run, however, you may regret not having invested your money in the metal wheels.

Pram Design "A"

First of all, the specification of a normal "de-luxe" pram is sure to be of interest. This model pram (A) is manufactured on realistic lines, being the type usually bought in the shops. It is a super quality model, with strap springs and steel body having an embossed design. Mudguards are

fitted to the 6in. diameter rubber tyred wheels; the body measures 18ins. by 9½ins. It is fitted with a laced hood and neat apron, with black tubular fold-over lever and nickel-plated hood joints.



A box type, easy and cheap to make

Now, it is not easy to try and copy such a pram. The body could be shaped from ¼in. wood, and the edges covered with stiff cardboard or a strip of lino material. The shaped sides need to be held together with cross pieces at the top ends, with two or three at the bottom. These act as braces and keep the sides the correct distance apart when nailing on the covering material.

The body is supported by suspension springs. You will have to

build a chassis consisting of two metal axles affixed to the springing. The wheels need to be fitted on axle stems, and be held with cotter pins, with a covering grease cap.

The point is that you cannot get the pram wheels, the axles or the springing, nor the fasteners for the springing and the body pivots. You will, to copy such a pram, have to make these parts. It might be possible to pick up second-hand toy pram wheels.

Hood Bracing

Even with these difficulties overcome, the pram hood fittings will cause some bother. Strip metal could be bent into "ribs" for the hood, the latter, like the apron, being black or brown leatherette. After being attached, the hood needs bracing

have a screw going through the handle and the bar ends. The wheels are attached with suitable coach screws (not carriage bolts) and washers.

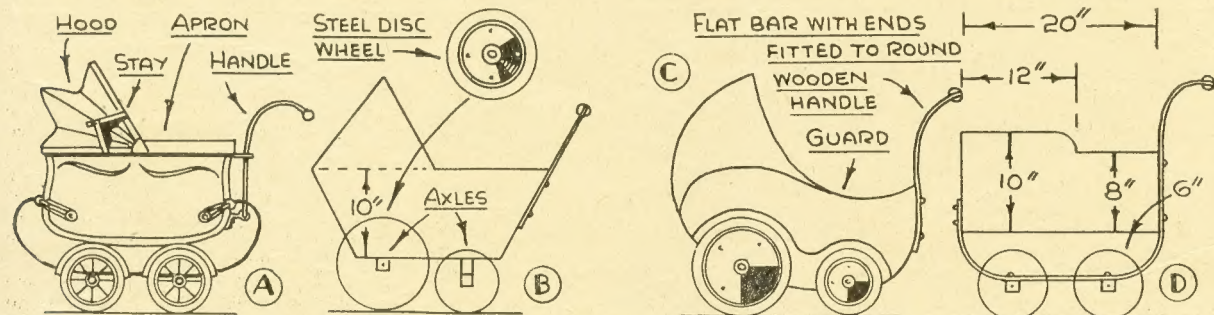
Pram Design "C"

A low-built, streamlined type is at C. This is on modern lines and just as easy to build as the previous model. Cut the sides from $\frac{1}{4}$ in. wood, then cover the edges with some thin pliable material, such as cardboard or lino. Be sure to fit the cross pieces between the sides before, of course. You particularly need the cross pieces at the bottom of the body in the approximate position of the wheel centres so that the wheel screws have something solid to drive into. The cross pieces should be cut from $\frac{1}{4}$ in. wood, and be about 2 ins. to 1 $\frac{1}{2}$ ins.

prevent rubbing and wear at the hubs. A handle is made up similar as the one described for model B. It will be noticed that two screws are required to fix the handle, so it will be necessary to have cross pieces at these points.

Pram Design "D"

Prams, minus a hood, of course, seem to lack something. In the design at D, a simple surround is provided and this dodge saves a lot of constructional bother. The body, prepared from $\frac{1}{4}$ in. wood or possibly an old soap box, is rather plain. To make up for some of this plainness, and also raise the body higher so that 6 in. wheels (which are considerably cheaper than the 10 in. size) can be used, it will be observed that the handle bar and a form of springing are in one piece.



Four distinctive types of toy pram which should give ideas for completion

with suitable metal stays. The pushing handles needs to be made out of tubular rod, correctly bent and flattened at the ends for boring and fixing with screws. Nothing but difficulties, obviously. Another plan is to have the wheel axles fitting to flat bar which is bent to screw to the underside of the body. This is much easier, but you will still experience difficulties.

Pram Design "B"

A basinette type of carriage is shown at B. It is fairly small, the body being made up to width with 10 in. by $\frac{1}{2}$ in. wood, such as deal shelving. It is possible to obtain the sides and hood pieces from two lengths of board. The hood pieces are butt-jointed on after cutting to shape. The sides are nailed on $\frac{1}{2}$ in. stuff which will form the bottom and ends. The width of these could be 10 ins. or more.

A 1 in. square wooden axle is screwed beneath the body. It is for the 10 in. diameter front wheels, such as the steel disc type. The rear wheels are 6 ins. in diameter, which means that the axle bar must be cut wider, as seen in the elevation. The pushing handle is flat bar, 1 in. wide by $\frac{1}{4}$ in. thick, affixed with round-head screws.

The handle, which is a length of 1 in. dowel rod or piece of broomstick, is slotted at the ends to fit tightly and neatly on the bars. It is advisable to

wide. Attach them with glue and 1 $\frac{1}{2}$ in. oval nails.

The approximate position of the 10 in. and 6 in. wheels is found and the diameter of the wheels scribed with the compasses. A shaped piece of $\frac{1}{4}$ in. stuff, cut to suit the contour of the wheels, as in the elevation, is prepared for both sides. Note that there is about a 1 in. clearance.

When these shaped pieces are attached with glue and nails, they form mudguards to the wheels. The latter, of course, are attached with coach screws of suitable thickness and length, with metal washers added to

The bar is 1 in. by $\frac{1}{4}$ in. stuff, either iron or mild steel, the latter being preferred. You need to bend two identical bars—a simple job, really, if you go to the trouble of shaping a wood former. A piece of wood, 20 ins. by 6 ins., with the ends round to a 6 in. radius, will help you in bending the bar where it goes beneath the body for the wooden axles.

When the bars are prepared and drilled and screwed in position, the 1 in. square axles are secured with single screws and the wheels attached. Be sure to bore suitable holes for the wheel screws so the latter drive in without splitting the wood. You will need a spanner for driving purposes, as coach screws have a square head, and a threaded shank similar as a wood screw.

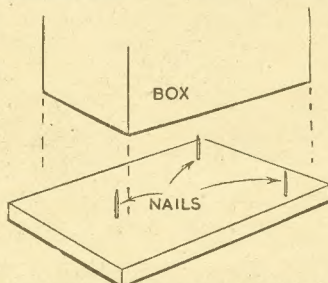
Finish the Prams

The prams should be finished in bright enamels. Some are light brown or deep blue. Providing the wood surfaces are filled up and made quite smooth, you could obtain a good finish by applying the enamel with a spray gun.

Alternatively, assuming you have a small spraying outfit, the prams could be cellulose finished. Even if you do not possess a spraying outfit, you can buy brushing cellulose paint. It is much thicker than the spraying stuff, being flowed on with an enamel brush. However, ordinary enamel will give just as good a finish.

A PAINTING IDEA

When painting the outside of wooden boxes and similar articles, a good idea is first to paint the bottom of the box then stand it on the points of 3 in. nails driven from the underside of a suitable sized board. This saves a large amount of time waiting for the paint to dry before commencing with the other sides. Three nails are sufficient for a small box. (J. E. H.—Wentworth).



A new and efficient shock-proof type of gramophone RECORD REPEATER

GRAMOPHONE record repeaters can be very useful, particularly where 7in. or 8in. discs are concerned, these having a playing time of short duration. Therefore, if you possess a number of these small records, or desire, at some time, to keep repeating part of a 10in. record for instrument practice work, dancing, etc., you need the repeater shown. Full-size pattern is given on page 83.

It is an improved, simplified type, easily made, using 1/16in. thick Perspex for the main shape, and 1/32in. stuff for the underside. It is the latter, you see, which is cut to lift the playing needle and "carry" it across the record to the start. All this is automatic, and there is no possibility of spoiling the surfaces of records.

A trouble, perhaps, with previous record repeaters designed by the writer, was the sudden concussion of the adjustment bar against the sound-box, or pick-up, needle. Although the shock was mild, it would, in all probability, have a bad effect on the stylus in time.

Shock-proof

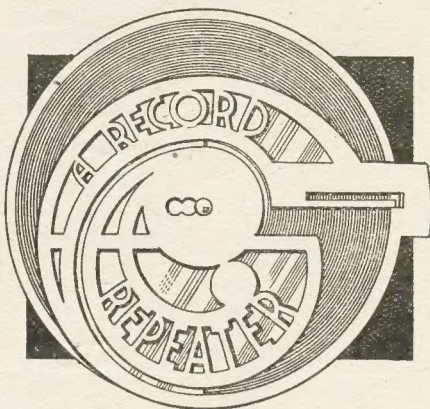
In the new repeater, there is no adjustment bar. There is merely a bar, cut to "cushion" the knock of the repeater against the playing needle. To obtain some adjustment, three pre-set spindle holes are provided. These enable the repeater to be used on records from 7ins. to 8ins. in diameter. The hole in between the other two holes is not for an intermediate size of record, i.e., a disc 7½ins. in diameter, as this is not a standard size, even in the case of direct disc recordings.

The extra hole, as shown at Fig. 1, allows the repeater to be more suitably adjusted on 7in. or 8in. discs which do not terminate properly towards the centre so that the needle is unable to escape into the repeater groove, at which point it is taken up by the thin underside of the repeater and carried, by the action of the turntable, across the record to the beginning of the sound track.

Full-size Patterns

Because of the difficulty of drawing the repeater shapes from a squared-up diagram, and the accuracy required, full-size parts are provided on page 83. There are merely two separate shapes, one fitting within the other.

The pattern page should be adhered to a flat piece of 1/16in. thick plastic material, then carefully cut with a fine fretsaw. Slightly thicker plastic material, such as celluloid or Perspex, plain or coloured, may be used. You could even use thin plywood, such as 1 m/m. stuff. Stiff card is unsuitable,



See full-size patterns printed
on page 83

as the edges fray easily. Paxolin could be used, which is a stiff material, rather like card impregnated with shellac. It may be cut with an ordinary fine fretsaw or a metal-cutting blade.

Helpful Waste

Whatever stuff you decide to use for the main shapes, be sure to keep the part which separates the two shapes intact, as this piece of waste helps to keep the parts truly centred when adhering them upon the thinner underside material.

Exercise every care whilst cutting the parts to shape. Do the inner frets first, i.e., the lettering, etc., then the outside shape. When cut satisfactorily, carefully remove the shape holding the two pieces together.

The needle track is only ¼in. wide, until it begins to widen towards the buffer bar. To ensure smooth working,

the edges should be neatly smoothed with fine abrasive paper. Roughen the underside of the work by lightly rubbing with coarser paper. This is to form a "key" for the adhesive and also remove trimmings from the frets, if any.

It is being assumed, of course, that you are using a plastic material. If you use 1 m/m. plywood, or even ½in. stuff, glue will obtain a better grip if the underside is roughened slightly with M2 glasspaper. If wood is used, have the grain running in the direction indicated by the arrow.

The Underside Shape

Having prepared the main repeater shapes, you can now attach them to a sheet of thin celluloid or other plastic material. A piece of old X-ray film, well cleaned, could be used, or any photographic film, if of a suitable size. The material must be reasonably thin—not more than 1/32in. thick. It may be transparent or coloured, but must be of a plastic nature so that the needle will ride on it smoothly, without damage or deep scoring.

You need a piece 7½ins. by 6½ins. Lay it on a flat board. Apply a thin smearing of cellulose cement on the reverse side of the outer repeater shape and press it down flatly on the piece of film. Hold it down for a few minutes, as the cement dries rather rapidly. Set in the waste shape, for centring purposes only, then apply adhesive to the central repeater shape and fit it down in position. Place another flat piece of wood on top and weight it down with heavy books. A heavy smoothing iron is a good weight to use.

Ordinary glue, obviously, cannot be

(Continued at foot of page 76)

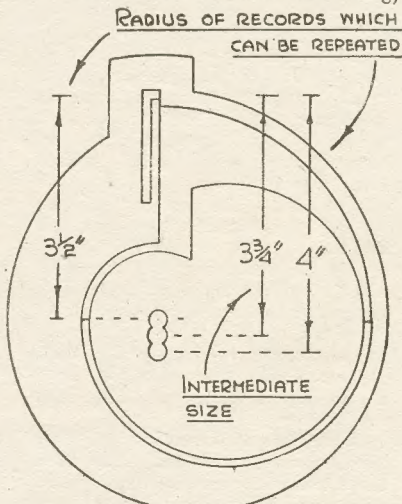


Fig. 1—The main shape, which takes 7in. or 8in. discs.

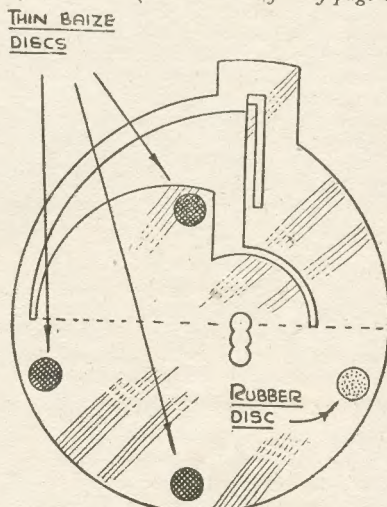


Fig. 2—An underside view, showing position of the pads

What to do and how to get the best out of WINTER CYCLING

DO not store your bicycle during winter. There are many days that are most pleasant for a run out into the countryside—sunny, bright, and exhilarating. In clear frost-bound weather, if the roads are not too icy, it is grand to go wheeling along the byways, for the country is often very strikingly beautiful in its wintry garb. You get spacious views hidden during the summer by the wealth of foliage.

It must be confessed that when roads are ice-bound and riding precarious it is advisable to stay at home, but we do enjoy many calm dry clear days that tempt us out, and wise cyclists take every advantage of such. Choose your day when at all possible.

To obtain the best out of winter cycling one must be properly equipped and suitably clad. As to clothing, some prefer a polo-neck jersey, gauntlet mitts, and plus-fours or similar nether garments. In the bag take a roomy cape and a sou'wester and leggings—just in case! Then, even a snow squall will not harm you.

Warming Up

With a three-speed gear you can drop into low gear to get a spot of fast pedalling when the air is frosty and you need to keep your circulation going. The riding position should not be too low; it is better to sit up and face the elements.

You will require good lighting, if likely to be abroad after dusk. Dynamo lighting is now in favour,

and with the improved modern sets you can put your faith in your lamps. A red rear light that is reliable should be used.

As to the machine itself, it is advisable to have good non-skid treads on the tyres. Badly worn smooth tyres in winter may be risky. And no cyclist likes "skids".

Keep the cycle well greased and oiled. The chain, unless protected by a gear-case, should be periodically treated with graphite grease, removing any surplus, just a thin film being sufficient. Pack all bearings with grease, the pedals in particular. Bright parts of the machine should be smeared with a thin coating of Vaseline.

In Inclement Weather

Many young folk depend upon the bicycle for getting them to work, and must perforce turn out in all kinds of weather. What if it does rain, or there are snow showers? Provided you are suitably clad, you can face up to anything. Cyclists who need to wear glasses require a hat or cap with brim or peak to afford protection—spectacles blurred by rain or moisture obscure the outlook.

The outfit for wet weather includes poncho, sou'wester, and gaiter leggings. The cape should be roomy to fit well over the handlebars, with a full skirt, a deep storm collar, and thumb loops. Avoid a skimpy cape!

Cycling spats are quicker to put on than overalls, and not so hot to ride in; they can be slipped on in a few seconds, and serve their purpose quite well; they are also kinder to the

crease in your trousers, if you cycle to business.

Shoes for wet weather cycling should have strap-over fronts. Cold feet can be avoided by wearing a pair of silk socks beneath the usual thick cycling stockings with "roll-tops". Both shoes and stockings should be tight-fitting to keep feet warm and snug in cold wet windy weather.

For Emergency

The wet-weather outfit should be nicely rolled up and packed into the bag or container and strapped to the machine, ready for use as required. It may be fine when you start out and stormy on your return journey.

Efficient mud-guards are essential in winter. There are various kinds of side shields, mud-splashes, or flaps that can be slipped on and off the mudguards easily; these help to protect the feet from splashes, and take up little room when not in use. Efficient mud-guarding makes a difference to comfort when riding in the rain.

Some riders are miserable enough if hands and wrists are exposed to cold rain; it is no trouble to carry a pair of mitts in the bag—these are better and warmer than gloves with separate fingers, and keep hands and wrists warm in the wettest of weather; they are easily slipped on if it starts to rain.

Do not try to be "brave and hardy" in wintry conditions by cycling in flimsy garments and with no protection; it is more sensible to be well prepared to withstand anything the elements have in store.

Record Repeater—(Continued from page 75)

used for adhering celluloid materials together. A cellulose cement—made from scrap celluloid dissolved in equal parts of amyl-acetate and acetone—or even cellulose paint, such as transparent cellulose lacquer, or the coloured stuff used for spraying, which is thin, makes the best bonding adhesive. It should be used, even if you cut the main parts from thin wood. It has a good grip on wood as well as plastics.

Completing the Repeater

When the adhesive has set, which should be in a couple of hours, remove the repeater parts from the makeshift press and inspect it for faults, if any. If you have been careful, no faults should be seen. The work should be quite flat and a lot more rigid in the hands.

Prise away the centering waste stuff. It should come away easily, unless you have accidentally spread some of the adhesive on it, in which

case it may be sticking here and there. Use every precaution when attempting to take it away.

A back view of the work is shown at Fig. 2. It will be observed that a certain part of the underside material is cut away, apart from the outside shape. You will, for example, need to clear the three spindle holes, and see that the buffer bar is separated so it is free to bend. The rest of the inner cutting is a clearance gap for the needle.

Note the dotted line. The clearance gap must not extend beyond this line. When you have cut the underside to shape (this is easily done by fretsawing in the normal way, with the work supported, face side upwards, on a cutting table), smooth all edges, then prepare the pads.

These pads are essential, and their position very important. You need three thin felt, or baize, pads $\frac{1}{8}$ in. in diameter. Also a thin rubber pad, of the same diameter. Note that *thin*

pads are wanted.

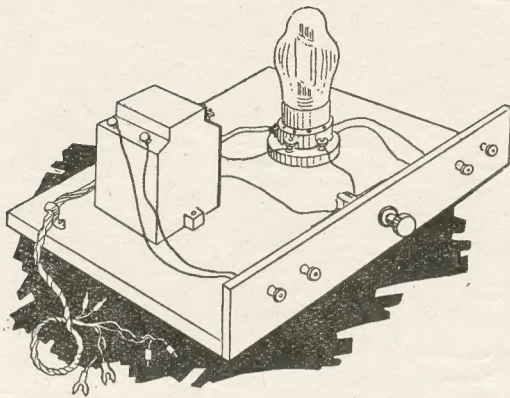
The rubber pad could be a bicycle inner tube patch, preferably a new patch. The felt pads must be of the same thickness. When adhered in position, as shown, the repeater is completed ready for testing on a gramophone.

A $\frac{1}{8}$ in. Needle Clearance

Having placed a record on the turntable, set the repeater on it, so one of its holes engages with the spindle. Fit a playing needle in the pick-up or sound-box to project $\frac{1}{8}$ in. Set the needle on the record, inside the gap, and start the motor.

When the record has finished playing, the needle should escape into the guide track and, with a quick, swirling action, be taken to the start of the record. You will be fascinated at the simplicity of the whole action, but much depends on the sound track terminating properly so the needle is free to ride across the repeater.

How the amateur radio enthusiast can construct a ONE-VALVE AMPLIFIER



THIS unit is easy to make up, and none of the few parts required is critical. Any Low Frequency coupling transformer with a ratio of between about 1 : 3 and 1 : 5 is suitable, and this and the simple on-off switch and terminals are easily obtainable. A valve can be bought at any radio shop, if one is not already to hand, and the type to use will be explained later.

What the Amplifier will do

The signal from a crystal set, one valve set, microphone or gramophone pick-up is taken to the two terminals connected to the transformer. The transformer provides a certain amount of amplification, and the valve a great deal more, so that the signal at the output terminals is very much stronger.

The amount of amplification obtained depends upon the valve type and high tension voltage. However, there should be no difficulty in getting good speaker volume if a loudspeaker of average efficiency is used.

Where the input to the amplifier is

Smoothing China

I HAVE a china vase, the neck of which has been broken, leaving an irregular edge. Could you tell me a way to get it even.

(N. A. C.—Newport)

WE suggest you try filing it flat. Use a sharp second cut file, keep it lubricated with water and use it carefully—the result should be a reasonably smooth end. This could be polished by rubbing first with bathbrick and water, and finishing with fine pumice powder and water.

strong (as if used with a one valve set tuned to local stations) the output will be more than sufficient for ordinary domestic listening.

Valve Type

If a valve is to be bought, then a pentode such as the Cossor 220HPT (or any of its equivalents produced by other manufacturers) is recommended. Such valves take little current and amplify considerably.

Any valve to hand can be tried, of course. A triode valve, though cheaper and quite good, amplifies rather less than a pentode.

If a triode valve is used and reasonable loudspeaker reproduction is required, the input to the amplifier must be fairly strong. (A good one valve set, or an efficient crystal set on local stations, would give just about sufficient volume). The best type of triode is that known as a Power, or Small Power valve.

A suitable valve holder is required. A pentode valve holder is shown in the diagram. A triode has no central pin on its base, so if such a valve is used, then the holder will only need to be of the four-pin type. Alternatively, the five-pin holder shown can be used, and it will then be quite in order to plug in either a triode or pentode without changing any connections.

Construction

A baseboard 5ins. by 4ins. by $\frac{1}{2}$ in. thick has a terminal strip about 1 $\frac{1}{2}$ ins. high screwed along the front. Dry varnished plywood is suitable for the latter. Drill holes for switch and terminals and fix these in position.

Screw down the transformer and valve holder as shown in Fig. 1. This diagram also shows all the connections. Some valve holders have the one terminal marked with "A" instead of "P" and this is quite in order, "Anode" and "Plate" being the same. "F" means "filament" and "G" means "grid".

Some older transformers have two terminals marked "P" and two marked "S". This means "Primary" and "Secondary". Connect the primary terminals to the two input terminals, and the secondary terminals to grid bias and "G" on the valve holder when using this type of transformer.

For the battery leads, lengths of insulated flex are used. After marking the ends with suitable tags and plugs, all the leads may be twined together to make a single battery cable.

If Fig. 1 is examined carefully, there should be no danger of making any errors.

Battery Supplies

The best grid bias voltage will depend upon the valve and high tension voltage. Therefore, try various voltages between 1.5 and 9 to find which gives best results.

For maximum volume a 120 volt high tension battery is required, but a lower voltage will give quite good results.

If a one valve set is being used, the amplifier can be driven from the same batteries. If this is done it will be best to omit the H.T. minus and L.T. minus battery connections from the amplifier, instead of taking a wire to the earth terminal of the one valver. This will avoid unnecessary duplication of leads.

For low tension, the 2-volt accumulator will be used in the usual way.

Using the Amplifier

With crystal or one valve sets, connect two short leads from the

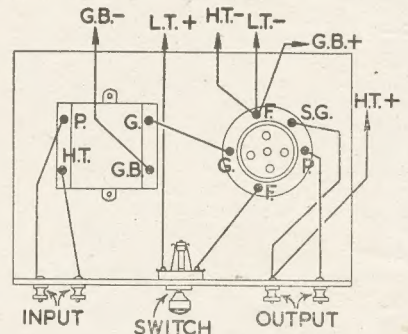


Fig. 1—Complete wiring diagram

phone terminals on the set to the input terminals on the amplifier. Then connect speaker or earphones to the output terminals (see Fig. 1).

With a gramophone pick-up, two leads are taken from it to the input terminals. But with some types of pick-up results may be slightly better if the transformer is disconnected. In this case take one pick-up lead to grid bias and the other to terminal "G" on the valve holder.

If one earphone is connected to the input terminals and a second to the output terminals, sounds picked up by the former will be heard amplified in the latter. If a change-over switch is added so that each earphone is used alternatively as microphone and earpiece, a two-way "amplified telephone" results. With two small speakers instead of earphones, volume will be sufficient for a small loudspeaking telephone communicator similar to that used in modern offices.

A helpful instrument for the handyman for cutting and DRAWING ELLIPSES

THE ability to draw ellipses accurately is necessary to all who desire to produce their own designs. Careful selection of a suitable portion on an ellipse will often supply a curved line which might otherwise prove difficult to draw. A simple method which employs nothing but a length of cotton and three pins is known to most craftworkers (Hobbies, July 7th, 1948, page 138), but a more practical and permanent instrument may be made as follows.

It consists essentially of four "channels" centrally mounted on a square base of thin sheet metal. These four channels "A" in diagram, form two continuous "run-ways" at right angles to each other, but with an open space at their crossing.

Moving Parts

There are two sliding-pivots "P", each capable of freely moving to-and-fro within the extreme limits of its own run-way.

These pivots are joined together by a beam "B" having a series of holes along its centre line. The shape, or "flatness" of an ellipse depends upon the number of holes between pivots. If a pencil point be inserted through any of the remaining holes, and a slight sideways pressure applied, the beam will move. One slider travels horizontally and the other slides at right angles to it. The resulting pencil line will be a perfect ellipse.

The size of ellipse depends entirely upon the distance of pencil-hole from pivot-hole. If pivot adjustments remain constant and pencil moved from hole to hole, then a series of parallel ellipses will be produced.

The Channels

Start with the four channels. They are made by bending thin brass strips round any suitable flat former. An odd length of brass curtain valance rail will serve, and also supply the bases of sliding pivots. Brass strip need only be paper thickness, and should be soft enough to permit of easy shaping with pliers. The semi-tubular shape, shown in inset "A", Fig. 1, gives adequate strength.

The length of channels controls the maximum difference possible between width and length of ellipse, though it has nothing to do with size of ellipse. For example, if a run-way is made up of two 6in. channels then, no matter how big the ellipse, it cannot be "flattened" by more than 6ins. Though, of course, the flattening may be of any desired lesser degree. From which it will be seen that the length of channels must be carefully considered in conjunction with the work

the instrument is expected to achieve.

Next make the sliding-pivots, shown at "P" inset, Fig. 1. Cut off two 1½in. lengths of the "former" used for shaping channels. Taper the ends slightly and solder a thin brass bolt upright in the centre of one side. Make sure the whole article slides freely in the grooves of the channel.

Cut out a 2in. square of tin or brass and solder the four channels into position. This is the only rather tricky piece of work involved, since each pair must be in perfect alignment or the sliding-pivot will not be able to

look at Fig. 2 and consider how the trammel is adjusted and used.

Draw the two axis as usual. Place the instrument over the lines so their crossing is centrally seen through hole in the base. Runways must coincide with axis lines, and may be held in place by drawing pins so fixed at ends that half their heads project into grooves of channels.

Remove the horizontal pivot and slide the other to the centre of runways. Place end hole of beam over pivot shank and insert pencil in hole which lies over end of axis. Move in

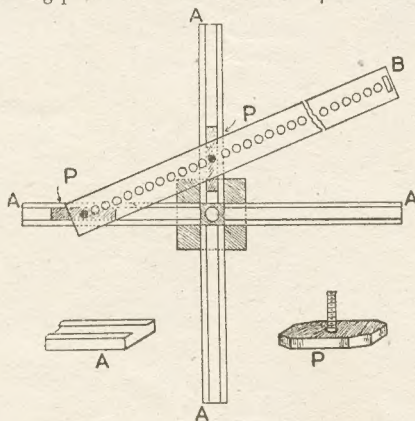


Fig. 1—Plan of general layout

cross the junction. In the centre of junction drill a fairly large hole through the base plate. This will enable the trammel, as such an instrument is called, to be truly centred when in use, since it makes the crossing of axis lines visible during adjustment.

Beam Piece

All that remains is the beam "B". A strip of any transparent plastic material, about 1in. wide and 1/16in. thick, will serve admirably. Its length depends solely on the size of biggest ellipse required. The maximum possible length of ellipse being twice the distance between end holes of beam. Down the centre drill a series of holes, reasonably close together, and having a diameter which just permits passage of the pivot shanks. At the extreme end make a small slit as indicated.

This slit should be just large enough to admit the passage of corner of razor blade, point of stencil knife, or whatever type of cutting tool you employ, or, of course, a circle for a pencil. The tighter the fit and the less projection through the beam, the truer will be the ellipse.

Trammel Adjustment

Construction being now complete

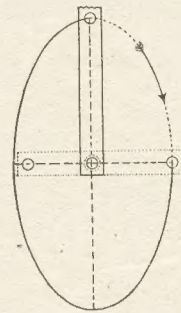


Fig. 2—Details of setting trammel

direction of arrow (Fig. 2) until the beam is in position indicated by dotted outline. The pivot will now be somewhere near bottom of its runway. Slide in horizontal pivot and insert it through hole of beam which is immediately over centre of crossroads. Screw on bolt nuts sufficiently to steady beam, but not to grip it.

Pencil or Ink

Draw the pencil round and the ellipse is produced as required. The operation is far simpler than the explanation, and anyone can produce ellipses at a very first attempt. If an ellipse is smaller than the channels then the blank spaces caused by intruding arms must be filled in after by freehand drawing.

For use with ink it is necessary to enlarge the hole nearest the slit in the beam until it will accommodate the end of a bow-pen. This must project through somewhat beyond ink-charge or unsightly blots will appear.

When using ink it is advisable to pass a small round-headed screw through hole preceding the one used by pen. With the head of this screw resting on the paper the beam will be raised clear and smudges avoided.

In order to vary the size of an ellipse when using pen or knife, do not forget it will be necessary to vary adjustment of both pivots.

The second of our new series on running MODEL RAILWAYS

ELECTRICITY as a motive power for model railways may have a lot to recommend it, but despite this, the humble clockwork mechanism provides an extremely efficient and reliable source of power to those who are unable to use electricity, either by reason of its expense or total absence.

In matters of cleanliness and correct lubrication, the spring-driven motor employed for driving a model locomotive is often treated in a very cruel way. It may get oiled at spasmodic intervals—sometimes not at all, and as for a “clean-up”—this may take place once in the proverbial “blue moon”.

Lubrication Important

The general performance and overall efficiency of an engine, both in sweetness of running and hauling capacity is more dependent on correct lubrication and cleanliness than can ever be imagined, and now that the gradually short evenings are with us, there is no better time to give model locomotives an overhaul so they may be in good trim for winter running.

The mechanism should first be removed from the engine body by taking out the appropriate screws generally to be found immediately under the boiler, as well as the knobs at the cab end of the reverse and start/stop control wires. The mechanism is withdrawn with an upward pull-away from the cab-end of the body; holding the latter in an inverted position meanwhile.

The next step in the rejuvenation of the mechanism is that of removing the congealed oil and grease from the pivots of the gear-axles and gears, as well as the unwinding of any pieces of thread, wool or fluff which have become inextricably wound around the axles themselves.

Unwanted Fluff

Incidentally, the braking effect of fluff wound round the driving-wheel axle has to be seen to be believed. So before starting to clean the mechanism, wind it up fully and see how far it will travel on a given length of track, or how many times it will run round a given oval. When all cleaning has been carried out, repeat the test and the tremendous improvement will be seen very obviously.

Some good quality petrol should now be purchased (“lighter-fuel” for preference, as modern “coloured” petrols are not too satisfactory) and poured into a large basin; this part of the work being carried out under “no smoking” conditions. The mechanism should be now fully

wound up and placed under the surface of the petrol, being allowed to run down whilst in that position.

Clean the Gear Wheels

Should this treatment fail to dislodge all the grit and foreign matter clogged into the gear-wheels, it is a good plan to use an old but stiff tooth-brush dipped into the liquid, thoroughly scrubbing about among the teeth of the wheels. Do not, however, use the tooth-brush whilst the wheels are actually revolving. Otherwise the hairs of the brush will be torn out, and, binding up the mechanism, do more harm than good.

When the mechanism is absolutely clean, remove it from the petrol and allow it to dry off naturally before proceeding to oil it with a really good-class sewing-machine or gramophone motor oil. Use the oil very sparingly on the bearings of all the various spindles, as well as on the bearings of the coupling-rods; taking great care not to allow any to get on to the treads of the wheels.

It may be wondered why it is so essential that only a modicum of oil should be used, and that the wheel-treads should be kept so clean. There are very good reasons. If too much oil, or too thick an oil is used for internal lubrication, it will only pick up every bit of fluff and grit that are thrown up by the engine as it travels along the track. If the wheel-treads get oily, not only will the locomotive tend to slip with a heavy train, but any grit on the rails will be collected on to the wheel-treads and form a sticky mass of material which will ruin the running of the best engine.

Spring Treatment

Now as to the spring, which needs especial treatment. A tube of graphite grease should be obtained from a gramophone dealer, and this should be spread rather lavishly between the leaves of the spring, whilst the mechanism is in a run-down condition. A little may also be placed on the winder ratchet and pawl (“click”).

It is important to emphasise the absolute uselessness of lubricating the spring of an engine with oil. As a spring unwinds, the leaves have to be able to separate easily, as well as to rub against one another. When oil is applied, this separation becomes erratic—due to a vacuum being formed between the leaves—and the running of the engine thus becomes also erratic, and its pulling-power very capricious.

Probably one of the greatest drawbacks of the spring-driven engine is its pronounced tendency to emulate

a jet-propelled racing car, both in acceleration and top speed; this failing being particularly noticeable in some of the smaller uncontrolled types of mechanism.

One of the most simple methods of slowing a mechanism down is by the introduction of heavy motor-car oil (“Mobiloil C”) into the governor cage.

Written by an expert for the beginner who wants to build a model railway at home.

This treatment will considerably reduce the speed of the engine without but a slight loss of power.

There is another method—which has the advantage of permanency—which consists of slightly increasing the weight of the governor balls; this being accomplished with the aid of a soldering iron and a spot of solder.

Electrically Driven Engines

Dealing now with the cleaning and oiling of electrically-driven engines, it will suffice to say that the same washing in petrol will work marvels, but it must be well remembered that under no circumstances must the power-unit be driven under its own power whilst in the petrol, as the slightest spark from the commutator and ———!

The petrol bath has no deleterious effects upon the armature, whether it be shellaced or plain enamelled wire, but in no case dry out the mechanism by artificial heat, as many insulation troubles may be started off in this way.

Get Inside

All the bearings of the mechanism should be treated to a spot of thin oil, not forgetting those which are normally out of sight, such as the rear armature bearing in an L.M.C. mechanism. Never oil the commutator if the brushes are carbon and the commutator copper. Such combinations are self-lubricating.

Finally, run the motor under its own power, and press a small piece of fine glass-paper (not emery-paper) against the revolving commutator, thus cleaning it up brightly. It will be found a good idea to wrap the glass-paper around a matchstick for this purpose.

To those not in the habit of spending a few hours at the commencement of the season “getting ready for the road”, it may be truly said that the time thus spent will be repaid a thousand-fold during the winter, when bad light often mitigates against a really 100 per cent. good locomotive overhaul.

(To be continued)

A handy and easy-to-make piece of work is this OPEN LOG HOLDER

SINCE the compulsory saving of coal came about, more and more people are resorting to burning wood. A well-stocked wood store it seems is very worth-while these days, and one should save all the prunings and cuttings from trees, and sawn-down trees should now be converted into logs ready for burning in the winter evenings.

Having the stock made up and stored in a dry but airy shelter or shed, the next thing to think about is the convenience of handling for actual use. Now in this article described here we believe we have the very thing for storing or keeping the wood handy for making up the fire.

The log rack illustrated in Fig. 1 measures 19ins. long overall, is 14ins. high and 10ins. wide, a very convenient size for the ordinary living or dining room. Any variety of wood is satisfactory and answers if about $\frac{1}{2}$ in. or $\frac{3}{4}$ in. thick. Salvaged timber scraped and cleaned would also do, as it could be suitably stained and varnished or painted.

The rack is made somewhat like a cradle, with two sloping sides, a slatted floor upon which the logs rest and a back rail which acts as a stiffener to the sides.

In Fig. 2 we see a side view of the

Each end of the rack is made complete, as detailed in Fig. 2. These are, for each end two boards 13ins. long by 4ins. wide, one cross rail, B, measuring 8ins. by $1\frac{1}{2}$ ins. and a top rail 9 $\frac{1}{2}$ ins. long by 3ins. wide. Trim each pair of boards and cut away a notch 3 $\frac{1}{2}$ ins. long and $\frac{1}{2}$ in. wide in each.

Connect the boards with the rail, B, screwing all firmly together with countersunk brass screws. Take care to keep the spacing between the two boards even all the way up so when the top rail, C, is added, an overlap of $\frac{3}{8}$ in. is allowed at each end.

Before the top rail can be fixed on to the boards, the latter will have halving cut to a distance of $1\frac{1}{2}$ ins., down from the top edge, and a detail of this is shown in Fig. 3. Set lines across the boards with the square and cut along these with a tenon saw to $\frac{1}{2}$ in. deep. Clean away the unwanted wood with the chisel, or cut down to meet the cross-cut line with the tenon saw. Round off the sharp corners and finally glue the rail in place and add either round-head



Fig. 1—Picture of completed article, in use

the rails, A, on the floor or bench, and erect the ends upon it temporarily while the spacing is checked. A measurement of 16ins. should be spaced between the tops of the two sets of boards as in Fig. 2, while at the bottom of rail, A, the measurement of 10 $\frac{1}{2}$ ins. should be spaced out.

Back Rail

The narrow top rail, D, can now be prepared and screwed on, the measurements and shaping being given in Fig. 2. Two screws at each end of the rail should be driven in to hold the sides perfectly rigid. The floor of the rack consists of five slats of wood each measuring 12ins. long and 1in. by $\frac{1}{2}$ in. in section. They are spaced out across the width and screwed to the end rails, B, as shown by the dotted lines in Fig. 2 and in detail in Fig. 4.

Two handles of simple shape, as

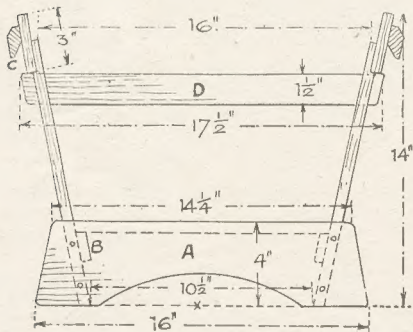


Fig. 2—Side and end view with dimension of parts

rack with the general dimensions of the parts. A start is made with the lower rails A. There are two of these cut from stuff 16ins. long by 4ins. To get the curve, a distance of 7ins. must be marked down from point X.

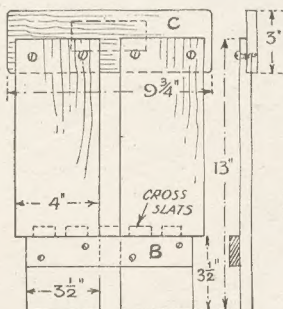


Fig. 3—Top rail fixing, and handle detail

brass screws or countersunk screws.

The position of the two rails, B and C, is explained in Fig. 2.

Some little attention must be paid here to getting the correct angle as seen in Fig. 2. First then, lay one of

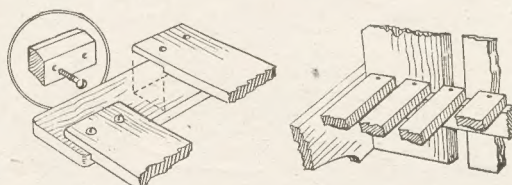


Fig. 4—How the floor slats are fitted across

shown, are screwed on to the ends of the rack, and the circled diagram in Fig. 3 gives an underside view of one of them, while the side view in Fig. 2 shows their actual shape and position.

Picture Enlarging—(Continued from page 81)

more accustomed to the light and the image. Often this will overcome the trouble.

One remedy which the writer has had occasion to use in extreme cases is to make a clean hole on the negative with a sharp needle, on the edge of the negative or in a spot that is not to appear in the print. The light will penetrate this hole and when it is

focussed and appears as a perfectly round spot on the easel without any fringe or furring, you can be fairly certain that the image is sharp.

Finally, do get into the habit of developing to finality. The instructions given with the paper will state the approximate time required for the paper to be fully developed. If you find that when this time is

reached the print is too dark, then you have undoubtedly overexposed. On the other hand if the image is poor and lacking in brilliance, or is on the grey side, then it requires more exposure that you estimated.

Watch these points carefully; make a study of them and you will find that the question of exposure is not so difficult as it seems.

Another chapter on the interesting subject of PICTURE ENLARGING

IT is over 45 years since the author made his first enlargement with a piece of apparatus having a paraffin lamp for its illuminant and the exposure requiring something like 20 minutes. The first result was so good that another picture was made from a second negative of a similar subject, a woodland scene. The negatives were, of course, glass plates, $\frac{1}{2}$ plate size, and the size of the enlargements 12ins. by 10ins.

Pictures that Last

Those two pictures still give enjoyment, for they were framed and have always found a place on one of the home walls. This foreword is given simply to illustrate the pleasure which any amateur photographer can be assured of getting once an enlarger is installed in the home, no matter whether it is a home-made one or one that has cost you a few guineas to purchase.

One has only to start projecting some negatives on to the screen to realise that there is an immediate urge to take the hobby more seriously.

Some folks, when the subject of enlarging has been mentioned, have made the remark that this branch of the work must be very expensive.

Of course it can be, like every other hobby. But there is no need to make it so, and if the few hints which are given in this short article are read and put into practice, it will soon be realised that if ordinary care is practised in the darkroom, and extravagance avoided, no amateur need be deterred from enjoying what is, undoubtedly, the most exciting and satisfying section of the hobby.

Economical Working

It follows that where enlarging is to be done, larger sizes of bromide papers are required than hitherto have been in use for contact printing. It has often been found that beginners lumber themselves with three or four different sizes and of different grades, surfaces and makes of papers. This is obviously extravagance, for much

pocket money can be used up in providing such a store.

Paper Size

Further it is very unnecessary and extremely inadvisable. Advice is very strongly urged to go for one make of paper and one size only at first. You will learn a tremendous lot of valuable information, which it is necessary to get, by this method of concentration in the early days. The best hint that can be given on this point is to start with paper not larger than 8 $\frac{1}{2}$ ins. by 6 $\frac{1}{2}$ ins. and of an ordinary grade of matt surface, such as Ilford Ordinary.

Chemicals are the next item that comes to mind. Here again, do not be tempted at first to have an array of bottles of this, that, and the other on your shelf, causing much time to be spent in weighing, dissolving and mixing. That sort of work is only economical where large numbers of prints are to be made. It is better to buy a few packets of developer such as Johnsons Metol-Quinol Pactums. With these, all the necessary chemicals are accurately compounded and the powders only require dissolving in the stated quantity of water, all for a few pence.

Stain Preventer

Acid-fixing powder can also be bought in small quantities as and when required, and you would be well advised to have a small quantity of Clearing Bath. This, if used between the developing and fixing, will prevent those stains which often occur on prints made by beginners.

While on this point, do make it a rule to work with clean measures, dishes and hands. Chemical stains caused by lack of cleanliness in the dark-room are most difficult to

overcome in the prints, yet are so easily prevented.

In the first attempts at making any enlargement it will be found that the old difficulty of exposure time is the hardest nut to crack. The most economical and certainly the most satisfactory way to solve this is by trial strips. Cut a strip from one of the pieces of paper about $\frac{1}{2}$ in. wide from across the narrowest side of the piece and, when you are satisfied that the image on the screen or easel is perfectly sharp, pin this strip across the image so it has some of the highlights and shadow details on it. Of course, this must be done with the



An interesting picture taken by the author

orange cap on the lens.

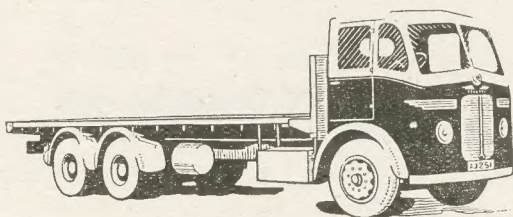
Give the whole of the strip five seconds exposure, then cover up four-fifths of the piece and allow another five seconds. Cover three-fifths and give a further five seconds and finally cover two-fifths and again give five seconds. Your strip has now got exposures ranging from five to 25 seconds and when this is developed to finality, you should have in that strip somewhere near the correct time of exposure for the whole of the picture that is to be enlarged. And it has only cost you a fraction of the cost of the paper to ascertain it.

Trial Exposures

If the section that received 25 seconds is not 'dark' enough then it means that the negative is on the dense side and requires more exposure. Or it may mean that the light is not strong enough, or that you are using too small a stop of the lens. Those are the points which your trial will disclose.

A word regarding the focussing. It sometimes happens that with a dense negative the image does not stand out clearly on the easel; it is difficult to discern detail. Try racking the lens very gently to or fro to get your eye

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(Continued foot of page 80)



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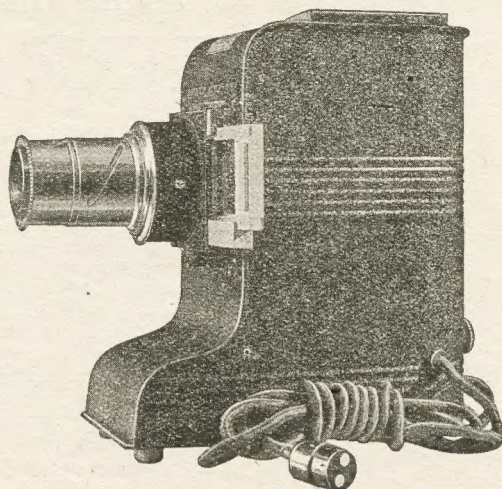
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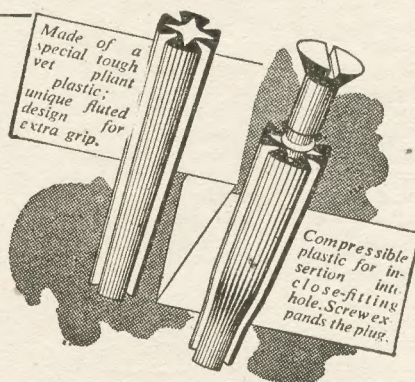
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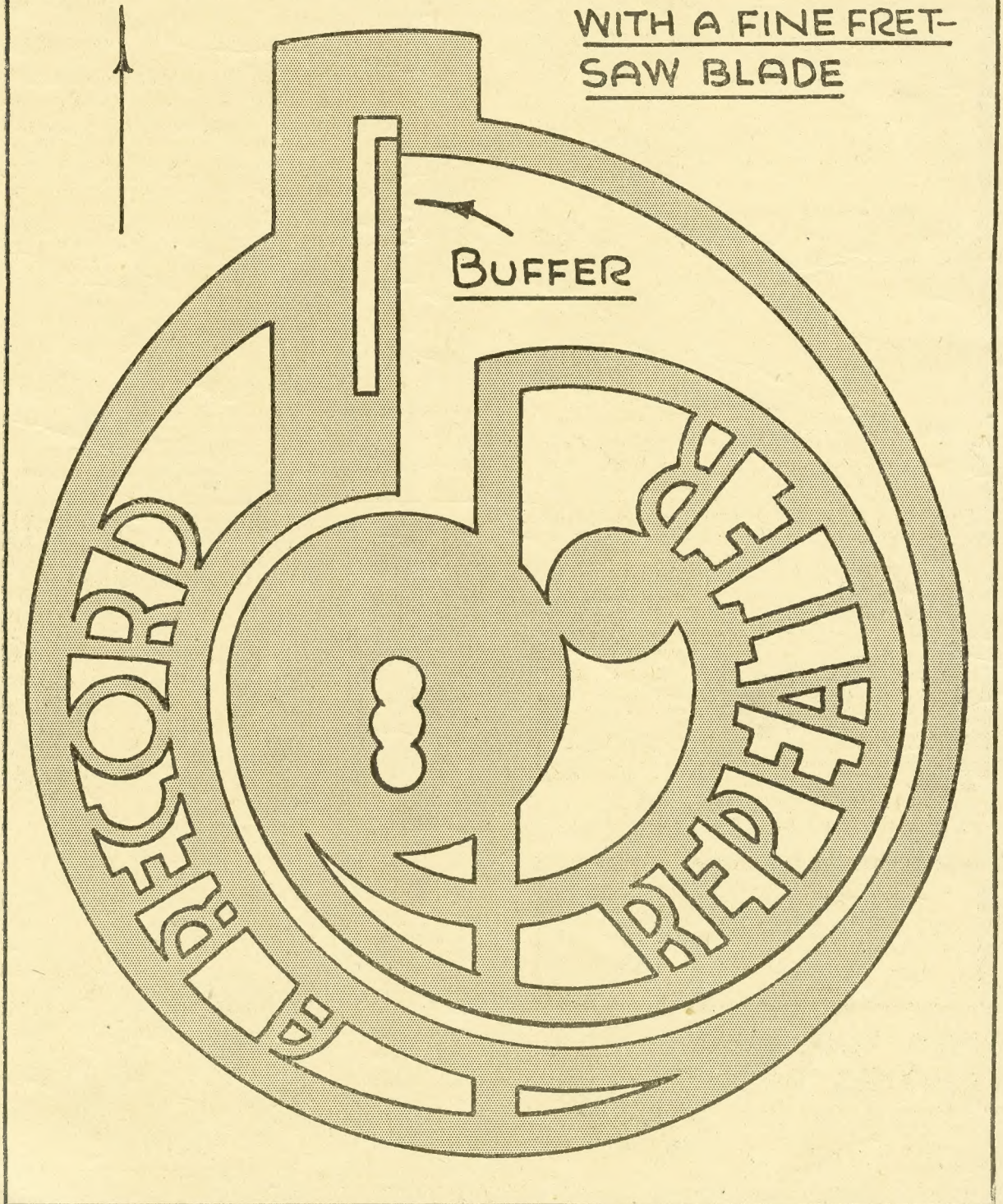
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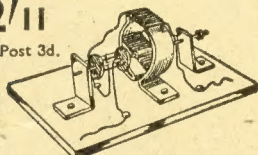
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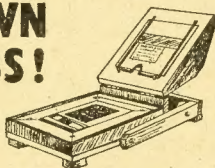
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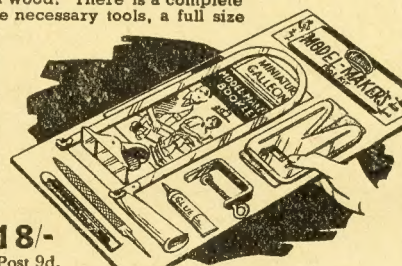
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